CLAIMS

1. An RTU assembly for controlling a system including plant units each having an Input/Output (I/O) port and carrying out a system function comprising:

    communication means;

    a plurality of cells interconnected by the communication means, each cell comprising:

    a microprocessor;

    a power supply;

    a memory for storage of data; and

    an I/O port for reception and transmission of data from a plant unit of the system and/or other cells;

    each of said cells being programmed to be independently operable to carry out at least part of any function of the system;

    at least some of said cells being programmed to have a data control function to configure and re-configure each cell to perform at least part of different system functions; and

    each of said cells being programmed to enable its data control function to source data from and to make data available to other cells as required.

2. An RTU assembly as claimed in claim 1 comprising a distributed database for storage of system functions and a program for the processing of such

functions.

3. An RTU assembly as claimed in claim 1 -or 2- comprising a distributed database for storage of system functions and a program for the processing of such functions and for the storage of the program to carry out the data control functions.

4. An RTU assembly as claimed in claim 1 -or 2- comprising a distributed database for storage of system functions and a program for the processing of such functions and for the storage of the system function, if any, being carried out by each cell.

5. An RTU assembly as claimed in claim 1 or 2 comprising a distributed database for storage of system functions and a program for the processing of such functions and for the storage of the program to carry out the data control functions and for the storage of the system function if any being carried out by each cell.

6. An RTU assembly as claimed in claim 1 or 2 in which the control functions are stored in the memory.

7. An RTU assembly as claimed in claim 1 or 2 in which each cell is programmed for continually updating the status, data requirements and system function being carried out by itself.

8. An RTU assembly as claimed in claim 1 -or 2 in which each cell is programmed for continually updating the status, data requirements and system function being carried out by each other cell.

9. An RTU assembly as claimed in claim 1 -or 2- in which each cell is programmed for continually updating the status, data requirements and system function being carried out by each other cell and itself.

10. An RTU assembly as claimed in claim 1 or 2 in which the data control function is programmed into one dedicated cell.

11. An RTU assembly as claimed in claim 1 or 2 in which the data control function
5 is programmed into at least two dedicated cells.

12. An RTU assembly as claimed in claim 1 or 2 in which each cell is programmed for the continuous downloading of information to other cells.

10 13. An RTU assembly as claimed in claim 1 or 2 in which the control function is so programmed that on a cell malfunction occurring it causes all data being inputted to the malfunctioning cell to be sent to another cell or cells and for that other cell or cells to carry out the system function previously carried out by the malfunctioning cell in a seamless manner.
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14. An RTU assembly as claimed in claim 1 or 2, in which the data control function is programmed to provide a unique identifier for each cell when transmitting data.

20 15. An RTU assembly as claimed in claim 1 or 2 in which each cell is programmed to identify data appropriate for that cell so as to only accept that data for subsequent processing.

16. An RTU assembly as claimed in claim 1 or 2 in which more than one cell is
25 connected to the same I/O port of a plant unit.

17. An RTU assembly as claimed in claim 1 or 2 in which the communications means incorporates a dual communications network and in which one of the networks is redundant except on malfunction of the other.
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18. An RTU assembly as claimed in claim 1 or 2 in which each cell has a dual redundant power supply.

19. An RTU assembly for controlling a system including plant units each having an I/O port and carrying out a system function comprising:

communication means;

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a plurality of cells interconnected by the communication means, each cell comprising:

a microprocessor;

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a power supply;

a memory for storage of data; and

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an I/O port for reception and transmission of data to or from a plant unit of the system and/or other cells;

each of said cells being programmed to be independently operable to carry out at least part of any function of the system;

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at least some of each of said cells being programmed to have a data control function to configure and re-configure each cell to perform at least part of different system functions;

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each of said cells being programmed to enable its data control function to source data from and to make data available to other cells as required; and

a distributed database for storage of:

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system functions;

a program for processing of said system functions;

a program for carrying out the data control functions; and

for the storage of the system function, if any, being carried out by each cell.

20. An RTU assembly as claimed in claim 19 in which the control functions are stored in the memory.

21. An RTU assembly as claimed in claim 19 in which each cell is programmed for continually updating the status, data requirements and system function being carried out by itself.

22. An RTU assembly as claimed in claim 19 in which each cell is programmed for continually updating the status, data requirements and system function being carried out by each other cell.

23. An RTU assembly as claimed in claim 19 in which each cell is programmed for continually updating the status, data requirements and system function being carried out by each other cell and itself.

24. An RTU assembly as claimed in claim 19 in which the data control function is programmed into one dedicated cell.

25. An RTU assembly as claimed in claim 19 in which the data control function is programmed into at least two dedicated cells.

26. An RTU assembly as claimed in claim 19 in which each cell is programmed for the continuous downloading of information to other cells.

27. An RTU assembly as claimed in claim 19 in which the control function is so programmed that on a cell malfunction occurring it causes all data being inputted to the malfunctioning cell to be sent to another cell or cells and for

that other cell or cells to carry out the system function previously carried out by the malfunctioning cell in a seamless manner.

28. An RTU assembly as claimed in claim 19, in which the data control function is programmed to provide a unique identifier for each cell when transmitting data.

29. An RTU assembly as claimed in claim 19 in which each cell is programmed to identify data appropriate for that cell so as to only accept that data for subsequent processing.

30. An RTU assembly as claimed in claim 19 in which more than one cell is connected to the same I/O port of a plant unit.

31. An RTU assembly as claimed in claim 19 in which the communications means incorporates a dual communications network in which one of the networks is redundant except on malfunction of the other.

32. An RTU assembly as claimed in claim 19 in which each cell has a dual redundant power supply.

33. A method of controlling a system including plant units each having an I/O port and carrying out a system function the control method using an RTU assembly having a plurality of cells communicating with each other, each cell comprising a microprocessor, a power supply, a memory for storage of data and an I/O port for reception and transmission of data from a plant unit of the system and or other cells comprising the initial steps of:

allocating at least part of a system function one or more of the cells; and

allocating a data control function of configuring or re-configuring the system function carried out by each cell; and

in which during operation of the method the continuous steps are carried out of:

operating each cell independently to source data from and to make

5   data available to other cells as required; and

re-configuring the system function carried out by any cell during

operation of the method dependent on control requirements.

10   34.   A method as claimed in claim 33 in which there is compiled a distributed
database for storage of:

system functions;

15   a program for processing of said system functions;

a program for carrying out the data control functions; and

for the storage of the system function, if any, being carried out by

20   each cell.

35.   A method as claimed in claim 33 in which at least two cells are programmed
to receive and process the same data for subsequent onward transmission,
all of the cells except one of the cells being programmed to reject the data for

25   processing until the cell processing the data ceases to do so when another of
the cells will process the data.

36.   A method of controlling a system including plant units each having an I/O port
and carrying out a system function the control method using an RTU

30   assembly having a plurality of cells communicating with each other, each cell

comprising a microprocessor, a power supply, a memory for storage of data and an I/O port for reception and transmission of data from a plant unit of the system and or other cells comprising the initial steps of:

5   allocating at least part of a system function one or more of the cells; and

allocating a data control function of configuring or re-configuring the system function carried out by each cell; and

10   in which during operation of the method the continuous steps are carried out of:

         operating each cell independently to source data from and to make data available to other cells as required;

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         re-configuring the system function carried out by any cell during operation of the method dependent on control requirements; and

         on replacing a cell of the RTU assembly the system function carried

20   by the replaced cell is allocated to the replacing cell or another cell by reference to the database and the database is updated.

37.   A method as claimed in claim 36 in which on a cell malfunctioning the steps are performed of:

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         allocating the system function carried by the malfunctioning cell to one or more of the other cells; and

updating the database.

38. A method as claimed in claim 36 in which each system function is allocated to at least two cells.

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39. A method as claimed in claim 36 in which the data control function is allocated to at least two cells whereby the malfunction of a cell does not prevent operation of the data control function.

10 40. A method as claimed in claim 36 in which each I/O port of a plant unit delivers data to and receives data from at least two cells.

41. A method as claimed in claim 36 in which at least two cells are programmed to receive and process the same data for subsequent onward transmission,

15 all of the cells except one of the cells being programmed to reject the data for processing until the cell processing the data ceases to do so when another of the cells will process the data.